

REMARKS

Claims 1-12 are currently pending in this application. Claim 1 is amended. No new matter is presented. The foregoing amendments and following remarks are considered by Applicants to overcome each rejection and objection raised in the Office Action and to place the application in condition for allowance. Accordingly, Applicants request the reconsideration and allowance of claims 1-12.

Claims 1-5, 7, and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Singer et al. (U.S. Patent No. 6,927,403). The Examiner takes the position that Singer teaches or suggests all the features recited in claims 1-5, 7, and 8. Applicants respectfully disagree.

Singer is directed to an illumination system that includes an object plane, a plane conjugated to the object plane, a first collector between the object plane and the conjugated plane, and a second collector after the conjugated plate. The first collector focuses a beam bundle of rays from the object plane in the conjugated plane. Singer provides a grazing incidence for minimizing debris contamination by having at least one more reflecting surface within the whole collector optics to divide the angle of incidence into at least two smaller angles of incidence. Singer also provides additional collectors to configure all the reflection surfaces for grazing incidence and thereby further reducing reflection losses. In other words, Singer discloses a divided (first and second) collector optics for arranging mirror shells in grazing incidence positions to minimize the degradation of the collectors due to debris (See Column 4, Lines 43-47).

The claimed invention provides features neither taught nor suggested by Singer. In particular, the claimed invention provides additional optics having at least one reflection surface to accept residual debris being passed through the debris filter and being exchangeable for restoring reflectivity after defined time periods when reflectivity of the additional optics has reached a defined degree of reduction due to deposition by the residual debris passed through the debris filter during operation of the radiation source.

Singer does not teach or suggest providing additional optics for forming convergent bundle of beams from the EUV light being emitted divergent from the light source plasma. Although a debris filter is used for catching the main part of the debris particles is arranged next to the light emitting plasma, residual debris is still passed through the filter and deposited on the first optical surface. To provide a high level of reflectivity additional optics are arranged so that they can be easily exchangeable and that can accept the residual debris. As a result, a high level of reflectivity can be achieved. Thus, Singer does not disclose exchangeable additional optics for receiving residual debris to protect the expensive main collector optics.

The Examiner states that Singer discloses a first collector that is exchangeable. Applicants disagree that the first collector of the Singer is exchangeable. As illustrated in Figs. 3a and 3b, the debris filter is described as a foil trap 316. However, when using a fil trap

the debris is completely eliminated since the debris is a particle stream that is stopped by the foil. Thus, in applying an absorbing foil trap there is no need to minimize the degradation effects of any following optical element. In addition, Singer does not disclose any need or possibility to exchange the first collector with additional optics as in the claimed invention.

It is respectfully submitted that Singer fails to teach or suggest additional optics provided as an auxiliary optical device having at least one reflecting surface to accept residual debris being passed through the debris filter and being exchangeable for restoring reflectivity after defined time period when reflectivity of the additional optics has reached a defined degree of reduction due to deposition by the residual debris filter during operation of the radiation source. Therefore, Applicants request the withdrawal of the rejection of claim 1 under 35 U.S.C. 102(e).

Claims 2-5, 7, and 8 are dependent upon claim 1. Therefore, it is submitted that claims 2-5, 7, and 8 recite patentable subject matter for at least the reasons mentioned above. Accordingly, Applicants also request the withdrawal of the rejection of claims 2-5, 7, and 8 under 35 U.S.C. 102(e).

Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Singer et al. (U.S. Patent No. 6,927,403) in view of Partlo et al. (U.S. Patent No. 6,064,072). The Examiner takes the position that the combination of Singer and Partlo teach or suggest all the features recited in claims 9-12. Applicants respectfully traverse the rejection of claims 9-12.

Partlo is directed to a plasma focus high energy photon source and the use of multi-layer dielectric mirrors used to achieve high collection efficiency over a large angular range. Partlo discloses that the collector should be coated with material possessing high glazing incidence reflectivity. Partlo further discloses that materials are palladium and ruthenium, and tungsten can be utilized.

It is respectfully submitted that there is no motivation to combine the teachings of Singer and Partlo to teach or suggest the features recited in claims 9-12. In addition, it is submitted that even in combination the cited references fail to teach or suggest the features recited in claims 9-12. Specifically, Partlo does not disclose that the reflective shells known from x-ray techniques are "highly reflective in the EUV region". Partlo only discloses that "many materials have an index of refraction having a real component less than unity in the x-ray region." (See Column 5, Lines 3-5). This technique does not provide a higher output in reflection because absorption can occur too. As a result, the cited references fail to teach or suggest highly reflective metals in the EUV regions as recited in claim 9.

Moreover, it should also be noted that claims 9-12 are dependent upon claim 1. Therefore, it is respectfully submitted that claims 9-12 recite patentable subject matter for at least the reasons mentioned above. Accordingly, Applicants request the withdrawal of the rejection of claims 9-12 under 35 U.S.C. 103(a).

Claim 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Singer et al.

(U.S. Patent No. 6,927,403) in view of Partlo et al. (U.S. Patent No. 6,064,072). The Examiner takes the position that the combination of Singer and Partlo teach or suggest all the features recited in claim 6. Applicants respectfully disagree.

The Examiner states that Partlo controls the debris and uses two collectors. Applicants disagree with this analysis. Partlo states that "designing the collection for operation nearest to grazing incidence will produce a collector most tolerant to deposition of eroded electrode material. (See Column 5, Lines 15-18). However, the eroded electrode material is not all the debris emitted from the source; there is a substantial part of fast (high energetic) electrons and ions emitted from the hot dense plasma which are clearly not considered by Partlo. Therefore, Partlo does not teach or suggest controlling the "debris".

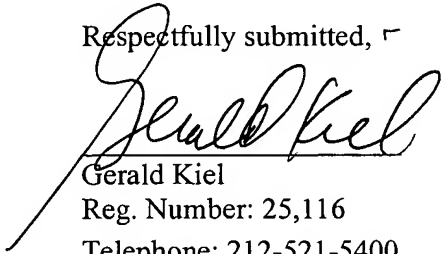
It is also submitted that Partlo fails to teach first and second collectors. Partlo discloses several collectors as being arranged within one another as coaxial reflector shells. There is no teaching for arranging a second collector downstream a first one. The disclosure of Partlo is directed to collection of as much as possible EUV radiation emitted from the plasma within a spatial angle of about 2π steradians. Thus, there is no clear teaching that a paraboloid mirror shell could be a sufficient shape for a first of two collectors arranged one after the other in accordance to the invention.

In view of these distinctions, it is respectfully submitted that claim 6 recites patentable subject matter. Furthermore, claim 6 is dependent upon independent claim 1. Therefore, it is submitted that claim 6 recites patentable subject matter for at least the reasons mentioned above. Accordingly, Applicants request the withdrawal of the rejection of claim 6 under 35 U.S.C. 103(a).

In view of the above amendments and remarks, Applicants requests the reconsideration of the present application.. Claim 1 is amended. No new matter is presented. Accordingly, reconsideration and withdrawal of the outstanding rejections and an issuance of a Notice of Allowance is respectfully requested. Should the Examiner feel that a telephone conference with Applicant's attorney would expedite the prosecution of this application, the Examiner is urged to contact him at the number indicated below.

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